

ACCESSION #: 9608200204

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Susquehanna Steam Electric Station - Unit 2 PAGE: 1 OF 5

DOCKET NUMBER: 05000388

TITLE: Unit 2 Manual Scram - Loss Of Auxiliary Bus 12A Due To

Unterminated Wiring

EVENT DATE: 07/14/96 LER #: 96-004-00 REPORT DATE: 08/13/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

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COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On July 14, 1996, at 1801, with Unit 2 in Condition 1 (Power Operation) at 100% power, the unit was manually scrammed when an auxiliary bus failed to energize following the transfer of its power source from the generator feed to the offsite power feed. The reactor was manually scrammed prior to the reactor vessel water level reaching + 13 inches. Reactor Core Isolation Cooling (RCIC) System and High Pressure Coolant Injection (HPCI) System initiated when the reactor vessel water level reached -30 and -38 inches, respectively. Feedwater level control was re-established and RCIC and HPCI were placed

in standby. All plant systems functioned as expected except the scram discharge volume inboard vent and drain valves did not open immediately after the reset of the scram, most likely caused by a sticking pilot valve. The failure of the auxiliary bus to energize is directly attributable to two leads not being terminated on a protective relay for one of the bus tie breakers due to personnel error. When the tie breaker was closed from the control room, the bus protective relaying actuated. The unterminated leads created a false unbalanced load on the bus. Per design, the protective relaying immediately initiated a trip and lock-out of the auxiliary bus thus deenergizing the bus. The two leads were terminated and the auxiliary bus and the start-up bus were walked down to assure that there was no equipment damage or any evidence of a fault on the buses. No equipment damage or faults were found. Appropriate station personnel were briefed on the event. The personnel involved in the error were placed on administrative leave pending final disposition. Additional supervisory oversight was added for non-Nuclear Maintenance work group activities. Also, the lessons learned from this event will be applied to non-Nuclear Maintenance work group activities. There was no safety consequence or compromise to the public health or safety as a result of this event.

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EVENT DESCRIPTION

On July 14, 1996, at 1801, with Unit 2 in Condition 1 (Power Operation)

at 100% power, the unit was manually scrammed when an auxiliary bus (EII

Code: EA) failed to energize following the transfer of its power source

from the generator feed to the offsite power feed. The failure of the

auxiliary bus to energize resulted in the tripping of the 'A' and 'C'

condensate pumps (EII Code: SC), the Wand 'C' circulating water pumps,

the 'A' reactor recirculation pump (EII Code: AD) and the 'A' service

water pump. The loss of the condensate pumps created a situation where

the low suction pressure trip on the feedwater pumps (EII Code: SJ)

actuated. The reactor was manually scrammed prior to the reactor vessel

water level reaching +13 inches. Reactor Core Isolation Cooling (RCIC;

EII Code: BN) System and High Pressure Coolant Injection (HPCI; EII

Code: BJ) System initiated when the reactor vessel water level reached -30 and -38 inches, respectively. Feedwater level control was re-established and RCIC and HPCI were placed in standby. The suppression pool bulk water temperature reached 920 F. No other challenges were made to the containment. The emergency operating procedures were entered as a result of the scram. The scram discharge volume inboard vent and drain valves did not open until 34 minutes after the scram was reset. All other plant systems functioned as expected.

CAUSE OF EVENT

A root cause analysis of this event was performed by a multi-disciplined Event Review Team. Additionally, separate, independent investigations and reviews were performed by PP&L's Nuclear Assessment Services and by PP&L's Corporate Auditing Services.

The failure of the auxiliary bus to energize is directly attributable to two leads not being terminated on a protective relay for one of the bus tie breakers, contrary to the requirements of the Work Authorization.

This condition is attributed to personnel error. When the tie breaker was closed with the lifted leads on the relay, the bus protective relaying actuated due to a false unbalanced load condition on the bus.

Per design, the protective relay immediately initiated a trip and lock-out of the auxiliary bus thus deenergizing the bus.

In addition, the following causal factors were identified:

- o The work package was used inappropriately.

- o Supervisory oversight of Relay and Test personnel was less than adequate.

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- o The division of responsibility between Relay and Test and the Nuclear Maintenance Organization is not clearly defined.
- o The 13.8 KV switchgear cubicle interiors are not well labeled.

The most likely cause of the delayed opening of the scram discharge volume inboard vent and drain valves was a sticking pilot valve.

REPORTABILITY/ANALYSIS

This event was determined to be reportable under 10CFR50.73(a)(2)(iv) in that the reactor was manually scrammed when an auxiliary bus failed to energize following a transfer of its power source from the generator feed to the offsite power feed. The manual scram is an unplanned ESF actuation. The scram discharge volume inboard vent and drain valves did not open until 34 minutes after the scram was reset. All other plant systems functioned as expected. The auxiliary bus failed to energize because two leads were not terminated on a protective relay for one of the bus tie breakers. When the tie breaker was closed from the control room, the bus protective relaying actuated due to a false unbalanced load on the bus. Per design, the protective relay immediately initiated a trip and lock-out of the auxiliary bus thus deenergizing the bus. There was no safety consequence or compromise to the public health or safety as a result of this unplanned ESF actuation.

Per design, the scram discharge volume vent and drain valves are open during normal operation. When a scram occurs, the scram discharge volume vent and drain valves are closed to conserve reactor water from the control rod drive system. After the scram is reset, the scram discharge volume vent and drain valves open to ready the scram discharge volume for normal operation. The delayed opening of the vent and drain valves did not pose any safety consequences or compromise public health or safety since the scram had occurred and the vent and drain valves had performed their safety function.

In accordance with the guidance provided in NUREG 1022 Supplement 1 item 14.1, the required submission date for this report was determined to be August 13, 1996.

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CORRECTIVE ACTIONS

The following corrective actions were initiated and completed:

- o Verified that proper hardware was used for modification.
- o Verified that no other bus equipment was damaged by the transient.
- o Terminated the leads properly and energized the auxiliary bus.
- o An investigation of the non-terminated leads was completed by independent personnel skilled in malfeasance type work. It was concluded that no tampering occurred.
- o Inspected all 13.8 KV and 4 KV cubicle internals for lifted leads and signs of obvious tampering.

- o Provided additional supervisory oversight for Relay and Test activities.
- o Reviewed all Relay and Test work packages for the previous three months for correctness and, where possible, verified the activities.
- o Provided briefing to station personnel on human performance, causal factors, and management expectations for handling high risk situations.
- o Provided briefing/review with appropriate station personnel with respect to standards and expectations for use of Work Authorizations.
- o The personnel involved in the error were placed on administrative leave pending final disposition.

The following corrective actions have been identified:

- o An evaluation of the division of responsibility between the Relay and Test group and the Nuclear Maintenance Organization will be performed.
- o Appropriate labeling on the interior of the 13.8 KV and 4 KV switchgear cubicles will be provided.
- o The results of the investigation of this event will be reviewed with Relay and Test personnel.

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- o A review of Nuclear Department work documents to verify the completeness of the work will be performed.

- o The strategy under which the post-modification testing was conducted will be reviewed.
- o The lessons learned will be implemented for other non-Nuclear Maintenance work groups.
- o Additional follow-up evaluation as a result of the delayed opening of the scram discharge volume inboard vent and drain valves is being performed.

ADDITIONAL INFORMATION

Past Similar Events: No previous scrams due to the loss of an auxiliary bus were identified.

Failed Component: None

*** END OF DOCUMENT ***
